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ABSTRACT

The Pan-Pacific Educational and Communication Experiments by Satellite (PEACESAT) project for interconnecting classroom of colleges in the Pacific Basin was tried for the first time in June and July, 1971, between two campuses of the University of Hawaii. The experimenters found that while classroom interconnection by satellite produces some frustrations (e.g., noise levels), it has infinite possibilities. Students can produce measureable communication outcomes, cognitive, affective, and instrumental, and they enjoy the experience of communicating with students at distant sites. (Author/JK)

CLASSROOM INTERACTION, SATELLITE-INTERPOSED

by

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ABSTRACT

The PEACESAT project for interconnecting classrooms of colleges in the Pacific Basin was tried for the first time in June and July, 1971, between two campuses of the University of Hawaii. The experimenters found that, while classroom interconnection by satellite produces some frustrations, it has infinite possibilities. Students can produce measureable communication outcomes, cognitive, affective and instrumental, and they enjoy the experience of enlarging the usual face-to-face classroom activities to include interpersonal communication with students at distant sites.

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In May of 1971 the University of Hawaii obtained permission from the National Aeronautical and Space Administration and the Federal Communications Commission to utilize time on ATS-1, a weather satellite in stationary orbit over the Pacific, to experiment with inter-campus communication. The Pan-Pacific Educational and Communication Experiments by Satellite (PEACESAT) was begun.

Under the direction of Dr. John Bystrom, this project shows promise of improving education in the Pacific Basin. This will report one series of experiments, carried out in June and July of 1971.

Arrangements were made in early spring of 1971 to interconnect two sections of the basic course in interpersonal communication at the University of Hawaii, one section at the Manoa Campus in Honolulu, the other section at Hilo College in Hilo, on another island, about 200 miles distant. Mr. Thomas Kugler, of Hilo College, and this writer, laid the plans; Dr. Elizabeth Kunimoto was the instructor of the Honolulu based section.

THE EQUIPMENT

The basic PEACESAT idea is to interconnect colleges in the Pacific Basin with low cost ground stations. The low cost is essential because most colleges in this area, perhaps even more so than colleges elsewhere, are not affluent. The ground station equipment, designed largely by Professor Katashi Nose of the University of Hawaii, therefore makes use of

standard "off-the-shelf" parts and is simple to operate and maintain. Each ground station is capable of sending a signal to the satellite; the signal can be picked up by similar equipment, anywhere over approximately one-third of the globe.

The signal carries voice, in a range of approximately 300 - 3000 cps, or facsimile. The facsimile apparatus will reproduce a page or print, fed in at one ground station, at any or all other ground stations, in about four minutes.

The dual voice-facsimile capacity is within the range of present technology at low cost. While most people, when they hear of PEACESAT, immediately think of TV programs sent from a parent station to several subsidiary stations, this is not PEACESAT. The PEACESAT concept is of co-equal stations <u>interchanging</u> information. The interchange must be two-way. When technology develops the capacity to <u>interchange</u> video programs at low cost, then video can be added.

Present technology can produce such a system, but only at enormous cost for ground stations, cost in terms of money, space and staff. The present PEACESAT stations are simple, require little space or can be portable, they are easily maintained and can be built for a few thousand dollars.

A principal purpose of the initial experiments was to discover what could be done with voice-facsimile interconnections.

THE PLAN*

With the two sections of the basic course, Honolulu-Hilo, the central purpose was to discover whether students, widely separated by distance but joined by PEACESAT, could learn to work together in problem-solving and the exchange of information. Seven experiments were scheduled: (1) Getting Acquainted; (2) Basic Intelligibility; (3) Giving Directions, or the communication of instrumental information; (4) Affects; (5) Problem Solving; (6) Information Gain; and (7) Attitude Prediction.

These experiments were scheduled in twelve hour-long sessions during the six week summer term.

The "getting acquainted" experiment consisted of each of 24 students, 12 at each ground station, giving his name and spelling it, and giving one fact about himself. Students alternated, first a Hilo student, then a Manoa student, etc. Students at both stations kept written notes. Criterion was reached when each student could spell the name and give one fact about each other student in the project.

Basic intelligibility was defined operationally in two ways: the ability to read short lists of phonetically balanced words (CVC) and to write down the words spoken; and the ability

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* The plan was adapted from ideas drawn from the Hawaii Communication Test, developed for the State Department of Education by Dr. Arthur Coladarci (Stanford) and Drs. Heinberg, Harms and Byers (University of Hawaii).

to select the words spoken from lists of five similar sounding words (multiple-choice). This and similar experiments to follow yielded four scores for each participant: a score as source, face-to-face and satellite-interposed, and a score as respondent, face-to-face and satellite-interposed.

"Giving Directions" or the communication of instrumental information, was defined operationally as the ability to describe an abstract figure so that the persons listening, in the classroom or at the other site, could respond that the figure described was the same as, or different from, the figure on their response sheets. Persons at each site had lists of figures such as those shown in Figure 1.

The "Affects" experiments were of several sorts. In the first experiment, students alternated, Hilo-Honolulu, speaking the single word, "Hello," so as to cause other students to mark their response sheets to correspond with the assignment sheet. See Figure 2.

Another "Affects" experiment required students to give a short explanation of how to get to the nearest (airport, restaurant, library) so as to help the respondents check one of five emotions: sad, happy, enthusiastic, indifferent, sincere. . . . Still another asked respondents to mark a scale from "Up" at one end, defined as happy, enthusiastic, confident, to "Down" at the other end, defined as sad, indifferent, discouraged. The source spoke in a language not known to the respondents. In this case, one source spoke in Japanese, one in German, and one in Italian.

Figure 1: GIVING DIRECTIONS

	Site 1 (Source for all odd numbered items)			Site 2 (Source for all even numbered items)		
	Same	Dif-ferent	Name of Source	Same	Dif-ferent	Name of Source
1. 	__	__	_____	__	__	_____
2. 	__	__	_____	__	__	_____
3. 	__	__	_____	__	__	_____
4. 	__	__	_____	__	__	_____

Figure 2: AFFECTS

Assignment Sheet		Response Sheet	
Source: _____		Respondent: _____	
Say "Hello" so that your respondents will mark: He sounds as if he		The speaker sounds as if he	
✓ likes me.	__ does not like me.	__ likes me.	__ does not like me.
__ is seriouos.	✓ is not serious.	__ is serious.	__ is not serious.
✓ is my super-ordinate.	__ is my sub-ordinate.	__ is my super-ordinate.	__ is my sub-ordinate.

In the problem solving experiment the students worked in groups of four, two from Hilo and two from Honolulu in each group. The students from Hilo were given a part, and the students from Honolulu were given another part, of the information necessary to discover new information and solve the problem.

The information gain experiment was the most elaborate of the term. A team of students at both sites chose a topic, analyzed it, and constructed a 15 item multiple-choice type test measuring the principal cognitions which the team hoped to communicate. This test was given, as a pre-test, to students not involved in the satellite experiment. Then each team had a one hour period to present its information via satellite, after which presentation the students at the other site took the test. Measures of central tendency were computed for the pre-post tests, giving an indication of the amount of gain achieved by the students using the satellite interconnection.

The final experiment was an exercise in predicting the attitudes of other students, known only by their satellite voices, on a controversial issue. Teams of students chose an issue and took a position which they judged would seem controversial to the students at the other site. Each team then marked a semantic differential scale, predicting how the respondents at the other site would mark, after the presentation.

Agree	/_/_/_/_/_/_/_/	Disagree
Reasonable	/_/_/_/_/_/_/_/	Outrageous
I would help put this proposal into action	/_/_/_/_/_/_/_/	I would actively oppose this proposal

The game was to make the means of the respondents' reactions approximate the prediction of the source team. This experiment was never completed because of the preemption of our satellite time for Apollo Moon Shot tests.

OUTCOMES

After each satellite interchange between the students, the instructors at each site compiled the scores on a single data sheet, giving a source score, face-to-face and a respondent score, face-to-face and satellite-interposed, for each student at his site for that day's experiment.

A student's face-to-face source score was the percentage of correct responses elicited from the other students in the classroom from which he was transmitting. (His source score, satellite-interposed, was the percentage of correct responses elicited from students at the other site. This score became available with the report from the other site.) A student's respondent score face-to-face was the percentage of correct responses given to students transmitting from his own classroom; satellite-interposed, his response score was the percentage of correct responses given to messages from the other site.

Each afternoon these outcomes were exchanged via facsimile, so that on the morning following each transmission, the students had a record of how they had done in the experiment of the previous day. Like some other aspects of this project, the data gathering and reporting methodologies were ad-libbed. There is no way to estimate, on the basis of hard data, how powerful a force this quick knowledge of success or failure was in motivating and guiding the learning that took place. The data do show that there was a steady increase in the accuracy and effectiveness of the students as they moved through progressively more difficult experiments. It is this writer's educated guess that the facsimile reports of the previous day's scores were exceedingly important.

CONCLUSIONS

To the best of our knowledge, the Hilo-Honolulu interconnection between sections of the basic course in interpersonal communication was the first regularly scheduled instruction utilizing satellite transmission. Several important preliminary lessons can be learned from this experience.

Written reports from students indicate that they were excited by the opportunity to expand the regular classroom exercises to include the satellite-interposed dimension. The project was successful in demonstrating that students, widely separated in distance but connected by voice and facsimile transmission, can get acquainted and can learn to communicate cognitive, instrumental, and affective information at a

satisfactory level of accuracy. They can work together to solve problems and they can produce statistically significant information gain in their friends at the other site.

Many frustrations and disappointments were encountered, a few of which are inherent in the mode of communication, many of which are susceptible to elimination by more and better planning. Most frustrating to the students was the noise level in the satellite classrooms, a function of the equipment. On several occasions only 20 - 30 minutes of the alloted hour were used. During the rest of the hour the students would sit and try to decipher spoken messages obscured by noise. The engineering people insist that this difficulty can be overcome without increasing the cost of the equipment.

A second need, susceptible to solution by the teachers involved, is for a better system for recording and reporting the communication outcomes of each interchange. A better system would almost certainly increase the satisfaction of the students and improve the rate of learning that might be achieved.

The nature and scope of the learning activities can be greatly improved. For example, the "get acquainted" activity might be improved by exchanging photographs, by mail, prior to the satellite interchange. As each student introducted himself, students at the other site(s) would try to select his picture from the display of photographs of students at

that style. On learning which photograph was that of the speaker, the students could begin learning to associate his voice and style with his photographic image.

PROJECTION

Plans are in progress (December, 1971) to establish a class interchange between the University of Hawaii in Honolulu and Wellington Polytechnic in Wellington, New Zealand. Wellington Polytechnic has a ground station designed by Professor A. T. Hanley and built by Polytechnic students under his direction. Permission from the several New Zealand and United States agencies to transmit technical information has been secured, and these transmissions are underway. Permission to transmit academic and other sorts of information has been requested.

Plans are in progress to estalish PEACESAT stations at a number of other sites in the Pacific Basin. Plans for a ground station at the University of the South Pacific at Suva, Fiji, and for another at the University of Papua and New Guinea, are well advanced. Prospects for ground stations at other sites, particularly in the Trust Territories, are good.

PEACESAT offers exciting possibilities for improving education through communication interchange in many technical and academic and social matters. Journalists, social scientists, librarians and public health people have been quick to express interest.

It is important that the developing network be seen as a system of co-equal stations, each sending-receiving, giving-getting, useful information, and establishing interpersonal understanding among students and teachers throughout the Pacific. The concept of two-way interchange is vital for assuring an acceptable degree of accuracy in the interpersonal interchanges as well as to foster cross-cultural understanding. The initial experiments between Honolulu and Hilo may have produced some useful ideas and information.